3. Quantum Computing

Prelims Level: Cyber Space Challenges

Mains Level: GS-III Awareness of Nano-technology

Why in News?

- Recently quantum processor of Google solved a problem in just 3 minutes.

About:

- It describes the point where quantum computers can do things that classical computers cannot.

- Google had achieved Quantum Supremacy by solving a problem which even with the most powerful classical computer available today would take about 10,000 years to solve in just 3 minutes.

Significances:

- ✓ Help to discover exotic materials for variety of requirements.
- ✓ Provide fool proof cryptographic protection against online frauds.
- ✓ Enable drug discovery to fight diseases.
- ✓ Design efficient batteries.
- ✓ Smarter devices and gadgets.

Qubit/Quantum Bit

- It is the basic unit of quantum information.

- It is a two-state quantum mechanical system, one of the simplest quantum systems displaying the peculiarity of quantum mechanics.

- In a classical system, a bit would have to be in one state or the other.

- Quantum mechanics allows the qubit to be in a coherent superposition of both states simultaneously, a property which is fundamental to quantum mechanics and quantum computing.

- The power of the quantum computer comes from its inherent parallelism, the ability to manipulate a large collection of qubits in one shot in ways that a classical computer will not be able to match up.